Cooking Charcoal Using the Double-Barrel “Bio-Char” Method

I’ve cooked a lot of wood into charcoal in various retorts: stainless-steel stockpots, new one-gallon paint cans, and cast-iron dutch-ovens. These retorts are fine for small batches of custom charcoal, but they do have one drawback: they require the use of large quantities of firewood to heat the retort and cook the charcoal.

This photo-essay details my version of the Bio-Char method of cooking charcoal in doubled-steel-barrels. This method may be further explored in various videos on YouTube. One big advantage to this method is that it uses very little firewood to cook the charcoal, and deadfall branches can easily be used in the process. If standard firewood is used in the process, it should be split into small splits, approximately 1” to 1.5” square.

Start by modifying a 55-gallon steel drum and lid as shown, with air vents cut or punched into the bottom and top of the sides of the barrel, and a vent stack installed in the top.

Modify a 16-gallon steel drum as shown, by punching vent holes around the top of the sides of the barrel, and one hole in its bottom.

Fill the 16-gallon retort barrel with splits of the wood to be cooked into charcoal; in this case 1”x1” splits of Eastern White Pine. Close the top of the retort securely with its lid and ring, and put the retort, Upside-Down (IMPORTANT), in the 55-gallon cooking barrel.

Fill the gap between the retort and the cooking barrel with scrap, dry wood, fitting in as much as possible.

Build a Tee-Pee campfire on top of the whole shebang, with some balled-up paper in the center of it, and light the fire.

Let the fire burn down below the level of the top of the cooking barrel, and put the top on the barrel, using gloved hands. Rocks can be used to weigh the lid down for a tight seal.

Flame will come out of the vent-stack, and eventually the fire will work its way down to the bottom of the cooking barrel, and will be able to be seen through the vents at the bottom.

Gasses will start to be driven out of the bottom vents (remember the retort was installed upside-down) in the sides of the retort, and these gasses will actually become the bulk of the fuel which continues to cook the wood in the retort. Those venting gasses will sound like small propane jets running at the bottom of the unit.

Soon the fire at the vent stack will change to thick white smoke and/or steam, depending on the type of wood being cooked, and how wet that wood was. I find that this pine wood gives off a particularly thick and noxious white smoke for about 20 minutes as it starts cooking.

I've actually stood next to the cooking barrel with a propane torch lit and at the mouth of the vent stack, burning off the smoke as it exits.

Note: The smoke and steam can essentially be eliminated by keeping a hot fire burning on top of the retort instead of capping the cooking barrel with its vented lid until the final stages of the cook. The hot fire must be kept burning high enough above the sides of the cooking barrel that the fire will get enough oxygen to burn with a flame. That flame will burn off the bulk of the smoke coming out of the retort and up between the two barrels, as seen below.

The white smoke/steam will change to light/clear smoke after 15-20 minutes after the water and the miscellaneous more-easily-driven-out volatiles in the wood have been cooked out of the wood.

Then the light/clear smoke can change to a darker gray smoke and/or a gas which reignites at the top of the vent stack.

After 2-3 hours total cooking time, the whole heating/cooking process will start to shut down, and the charcoal will be done. Allow the retort to cool for a few hours or overnight before opening it up to retrieve the cooked charcoal.

Here's a little video of the cooking process:

http://pyrobin.com/files/cooking%20charcoal.wmv

As with anything else in pyro, if you change something about this process: the wood that is being cooked, how green that wood is, the type of firewood, the size of the barrels, etc, your results may vary. That's not necessarily a bad thing, but you will have to get a "feel" for the process, and for ways to tune it to your particular methods and circumstances.

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